



**General Certificate of Secondary Education
2018–2019**

Double Award Science: Physics

Unit P2

Foundation Tier

[GSD61]

WEDNESDAY 14 NOVEMBER, MORNING

**MARK
SCHEME**

Subject-specific Instructions

In numerical problems, the marks for the intermediate steps shown in the mark scheme are for the benefit of candidates who do not obtain the final correct answer. A correct answer and unit, if obtained from a valid starting-point, gets full credit, even if all the intermediate steps are not shown. It is not necessary to quote correct units for intermediate numerical quantities.

Note that this “correct answer” rule does not apply for formal proofs and derivations, which must be valid in all stages to obtain full credit.

Do not reward wrong physics. No credit is given for consistent substitutions of numerical data, or subsequent arithmetic, **in a physically incorrect** equation. However, answers to subsequent stages of questions that are consistent with an earlier incorrect numerical answer, and are based on a physically correct equation, must gain full credit. Designate this by writing **ECF** (Error Carried Forward) by your text marks.

The normal penalty for an arithmetical and/or unit error is to lose the mark(s) for the answer/unit line. Substitution errors lose both the substitution and answer marks, but 10^n errors (e.g. writing 550 nm as $550 \times 10^{-6}\text{m}$) count only as arithmetical slips and lose the answer mark.

			AVAILABLE MARKS			
1	(a)	T = ultraviolet, microwave L = sound, ultrasound (4 × [1])	[4]	10		
	(b)	gamma, x-ray, UV, light, infrared, microwave, radio	[6]			
2	(a)	i = r on ray	[1]	7		
		wavelength constant (by eye) & same as incident wavelength parallel and perpendicular (dep on 2nd mark)	[1] [1]			
			[1]			
(b)	s = d/t	[1]	[4]			
	s = 68/0.2 or 136/0.4	[2]				
	s = 340 (m/s)	[1]				
3	(a)	(i) straight vertical line	[1]	8		
		(ii) 38	[1]			
		(iii) 58	[1]			
		(iv) increases	[1]			
	(b)	(i) dispersion	[1]			
		(ii) orange, yellow, green, blue, indigo, violet	[1]			
		(iii) Spectrum	[1]			
		(iv) (different colours) travel at different speeds in glass or refracted by different amounts	[1]			
		4	(a)		(i) negative, object, electrons, friction	[4]
					(ii) insulator	[1]
(b) – on left (A) + on right (B)	[2]					
(c)	I = Q/t = 13/10 = 1.3A	[1] [1] [1]	[3]	10		

				AVAILABLE MARKS			
5	(a)	correct symbols Lamp (bulb), Voltmeter, variable resistor	[2] [3]	[5]	12		
	(b)	(i)	middle graph			[1]	
		(ii)	remain constant			[1]	
		(iii)	$V = IR$ $= 0.75 \times 4$ $= 3 \text{ (V)}$	[1] [1] [1]		[3]	
	(c)	(i)	+ in left box – in right			[1]	
(ii)		0 V		[1]			
6	(a)	(i)	$E = Pt$	[1]	14		
			$= 200 \times 1800$ $= 360\,000 \text{ (J)}$	[2] [1]		[4]	
	(b)	(i)	(ii)	$P = IV$ $2.5 = I \times 5$ $I = 0.5 \text{ (A)}$		[1] [1] [1]	[3]
			(ii)	energy [1] (threshold mark) produced by 1 kW appliance [1] in 1 hour [1]			[3]
			(ii)	total number of kilowatt hours = power (kW) \times time (h) $= 3 \times 2$ $= 6$ cost = 90 (p)		[1] [1] [1] [1]	[4]
7	Gravity Hydrogen Coming together Increase in pressure/density/temperature Fusion Energy emitted						
		Response	Mark				
		Candidates describe in detail at least 5 of the above points using good spelling, punctuation and grammar. The form and style are of a high standard and specialist terms are used appropriately.		[5]–[6]			
		Candidates describe in detail 3 or 4 of the above points using satisfactory spelling, punctuation and grammar. The form and style are of a satisfactory standard and they have made some use of specialist terms.		[3]–[4]			
		Candidates describe 1 or 2 of the of the above points. The spelling, punctuation and grammar is limited. The form and style are of a limited standard and there is no use of specialist terms.		[1]–[2]			
		Response not worthy of credit.		[0]			
				[6]	6		

			AVAILABLE MARKS		
8	(a)	(i) Jupiter	[1]	11	
		(ii) Mercury Neptune	[2]		
		(iii) Gravity	[1]		
		(iv) asteroids comets	[1] [1] [2]		
	(b)	(i) heliocentric	[1]		
		(ii) geocentric	[1]		
	(c)	(i) one launched into space by man/man made	[1]		
		(ii) weather/spying/photography/communication	[2]		
	9	(i) Scale at least half-way, label	[2]		12
		(ii) 7 or 8 points plotted correctly (2 marks) 5 or 6 points plotted correctly (1 mark)	[2]		
(iii) Proportional section correct Flat section correct			[1] [1] [2]		
(iv) from 0 seconds to 25 seconds		[1]			
(v) straight line [1] through origin [1]		[2]			
(vi) gradient = change in y/change in x (or equiv) = 2 m/s ²		[1] [1] [1] [3]			
		Total	90		